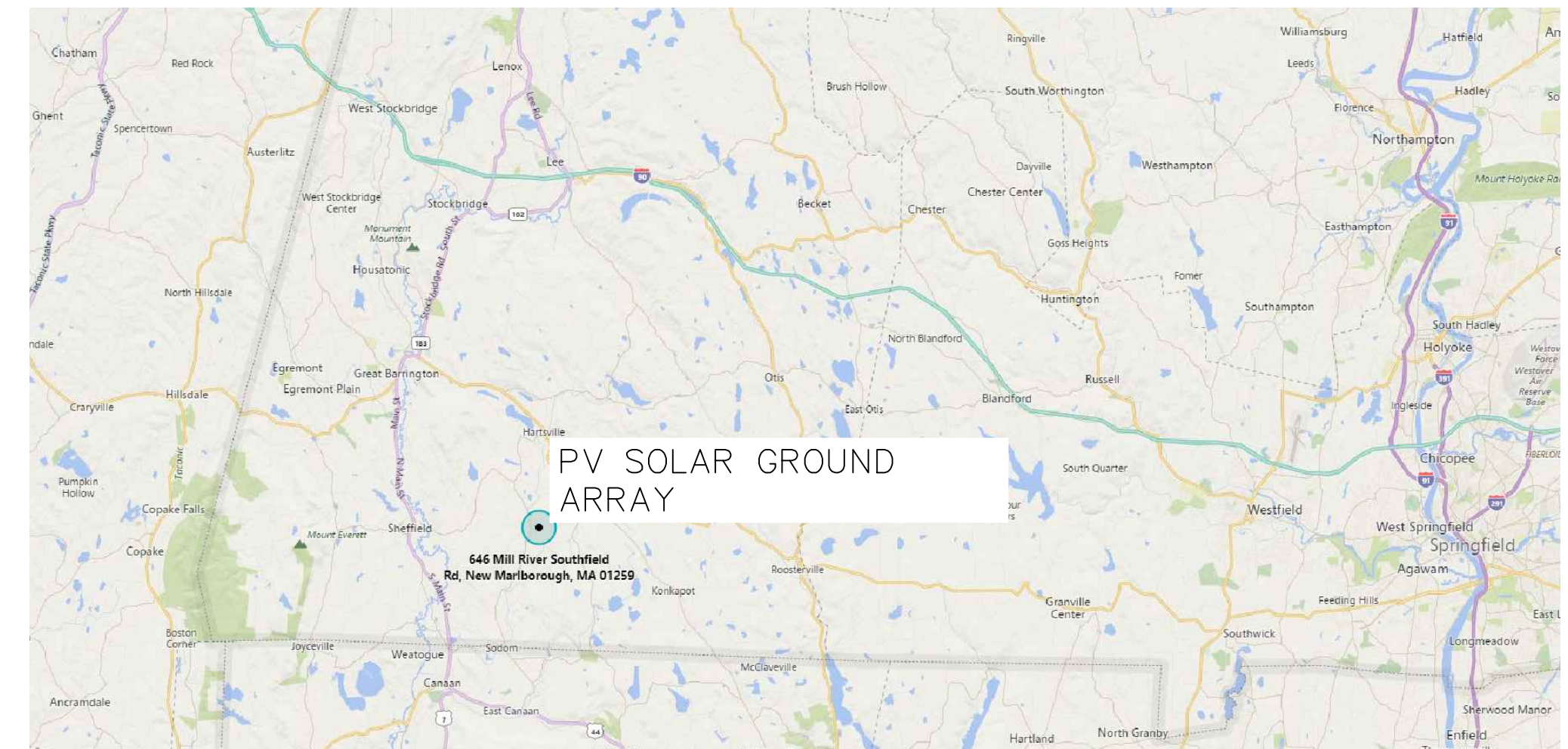
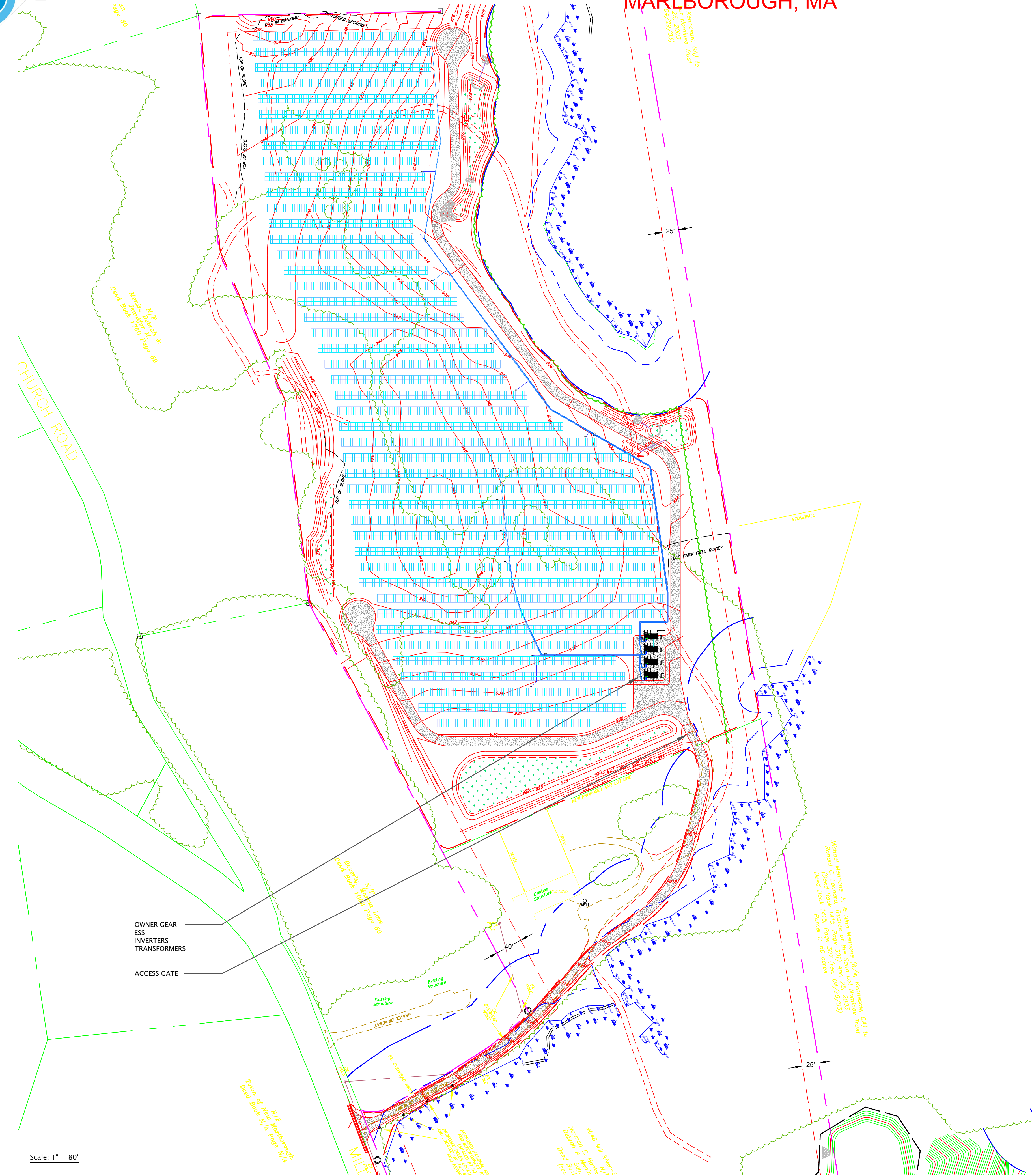




NEW MARLBOROUGH II - 2MW AC

646 MILL RIVER SOUTHFIELD RD, NEW MARLBOROUGH, MA



PARK AVENUE SOLAR SOLUTIONS
 102 GREENWICH AVE
 GREENWICH, CT 06830
 (203)698-0090

sound solar systems LLC
 supplying sustainable energy
 ONE PARK AVE
 OLD GREENWICH, CT 06870
 (203) 698-0050

**NEW MARLBOROUGH II
 COVER SHEET**
PV SOLAR GROUND ARRAY
 646 MILL RIVER SOUTHFIELD ROAD
 NEW MARLBOROUGH, MA 01230

PROJECT DATA - 2.0 MW AC

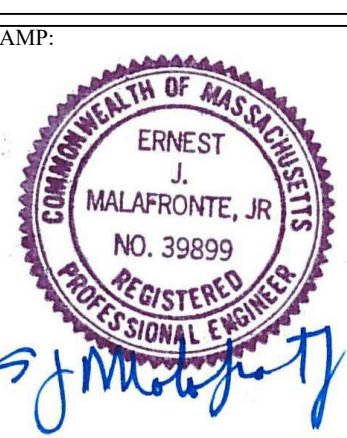
OWNER PARK AVENUE SOLAR SOLUTIONS
 ONE PARK AVE
 OLD GREENWICH, CT 06870

SOLAR ARRAY:

MODULE: HELIENE 72P 325W 72-CELL
 8,288 MODULES @ 325 WATTS EACH = 2,693.6 kW DC @ STC
 INSTALLED IN STRINGS OF 28 (1.5KV)

RACKING: GROUND MOUNT FIXED TILT 20°

INVERTER: SUNGROW ST556KWH-D250HV+4xSG125HV (4 UNITS)
 2.0 MW AC; DC-COUPLED ESS: 1.0 MW DC / 2,224 kWh



REVISIONS	
DATE	COMMENT
11.20.18	STORAGE
04.30.19	ESS
01.30.20	UTILITY REVIEW
03.09.20	PERMIT SET
JOB #	NEW MARLBOROUGH
DRWN	SD
CHKD	SG
SCALE	N.T.S
DATE	09-25-2017

C-1

NEW MARLBOROUGH II - 2MW AC
646 MILL RIVER SOUTHFIELD RD,
NEW MARLBOROUGH, MA

DESIGN CRITERIA	°C
ASHRAE Mean Extreme Low	-23
ASHRAE 2% High	29
Δt Rise at array	30
Weatherstation: Pittsfield Municipal (WMO 744104)	

Model Name	Power @STC	Voc	Vmp	Isc	Imp	t coef Voc, %/°C	Qty	kW DC
HELIENE 72P	325 watts	46.11	37.42	9.05	8.745	-0.32%	8,288	2,693.60

String Size	Power @STC	Voc	Vmp	Isc	Imp	Isc*1.56	Voc @ min °t	Qty
28	9,100 watts	1291.08	1047.76	9.05	8.745	14.1	1489.4	296

Combiner Manufacturer	Model	Fuse Size	Control Power	Fused Positions	Qty
SOLARBOS	DISC. COMBINER	15A	N/A	18	7
SOLARBOS	DISC. COMBINER	15A	N/A	22	9
16					

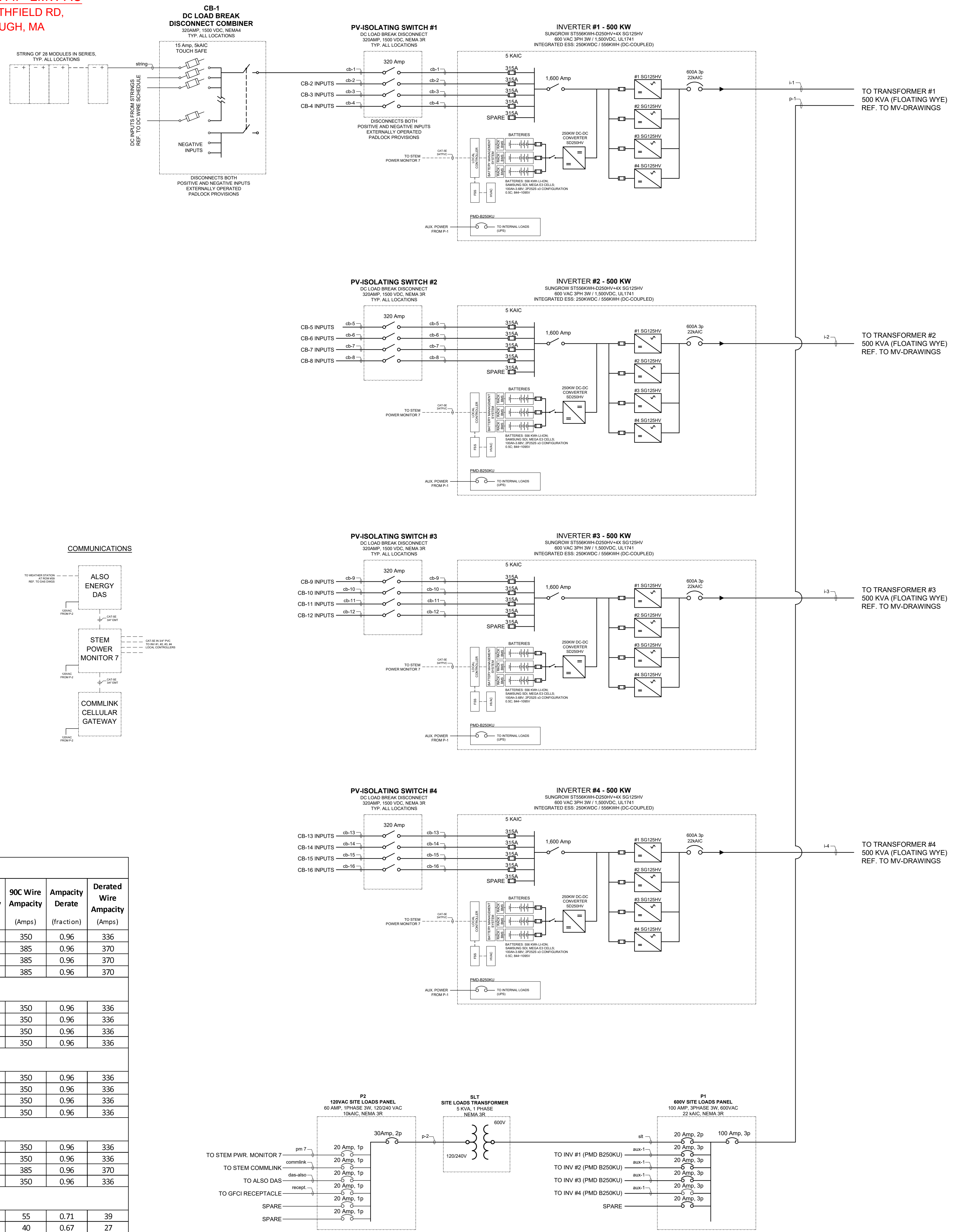
* Ungrounded; NEC 2020: 690.15 compliant, open both Pos. and Neg. Circuits; Transient surge suppression; NEMA-4 powder coated steel enclosure 30" wide; touch-save cover; padlockable

Inverter #	Manufacturer, Model	Power (kWac)	Nominal Voltage, (Vac)	Rated Current, (Aac)	I*1.25, (Aac)	OCPD (Aac)	Strings Connected	kW DC Connected	kWdc / kWac
Inverter # 1	SUNGROW ST556KWH-D250HV+4xSG125HV	500	600V 3ph, 3w	480	600	600	73	664.30	1.33
Inverter # 2	SUNGROW ST556KWH-D250HV+4xSG125HV	500	600V 3ph, 3w	480	600	600	73	664.30	1.33
Inverter # 3	SUNGROW ST556KWH-D250HV+4xSG125HV	500	600V 3ph, 3w	480	600	600	75	682.50	1.37
Inverter # 4	SUNGROW ST556KWH-D250HV+4xSG125HV	500	600V 3ph, 3w	480	600	600	75	682.50	1.37
296								2,693.60	

Wire Tag	Wire Run, ft	L1, L2, L3	EGC	Conduit Size	Vdrop, Volts	Vdrop, %	Conductor Insulation	Load, Amps AC	I*1.25	OCPD	C.Fill
i-1	45	(2 sets) 500 kcmil (Al)	2/0 AWG (Al)	3" PVC Sch.40	0.8	0.1%	XHHW-2, 90C, 1KV	480	600	600	27%
i-2	45	(2 sets) 500 kcmil (Al)	2/0 AWG (Al)	3" PVC Sch.40	0.8	0.1%	XHHW-2, 90C, 1KV	480	600	600	27%
i-3	45	(2 sets) 500 kcmil (Al)	2/0 AWG (Al)	3" PVC Sch.40	0.8	0.1%	XHHW-2, 90C, 1KV	480	600	600	27%
i-4	45	(2 sets) 500 kcmil (Al)	2/0 AWG (Al)	3" PVC Sch.40	0.8	0.1%	XHHW-2, 90C, 1KV	480	600	600	27%

Wire Tag	Wire Run, (ft)	Conductor	EGC	Nominal Voltage	Conductor Type	Conduit Size	Vdrop, Volts	Vdrop, %	Load, VA	OCPD	C.Fill (%)
p-1	30	#3 AWG (L1, L2, L3)	#6 AWG	600v (L-L-L)	(Cu) XHHW-2, 90C	1.25" PVC	0.7	0.1%	52,720	100	24%
aux-1	50	#12 AWG (L1, L2, L3)	#12 AWG	600v (L-L-L)	(Cu) XHHW-2, 90C	3/4" PVC	2.2	0.4%	13,000	20	14%
aux-2	69	#12 AWG (L1, L2, L3)	#12 AWG	600v (L-L-L)	(Cu) XHHW-2, 90C	3/4" PVC	3.1	0.5%	13,000	20	14%
aux-3	88	#12 AWG (L1, L2, L3)	#12 AWG	600v (L-L-L)	(Cu) XHHW-2, 90C	3/4" PVC	3.9	0.7%	13,000	20	14%
aux-4	107	#12 AWG (L1, L2, L3)	#12 AWG	600v (L-L-L)	(Cu) XHHW-2, 90C	3/4" PVC	4.8	0.8%	13,000	20	14%
slt	10	#12 AWG (L1, L2)	#12 AWG	600v (L-L)	(Cu) XHHW-2, 90C	3/4" EMT	0.0	0.0%	720	20	10%
p-2	10	#10 AWG (L-L-N)	#10 AWG	240v (L-L)	(Cu) XHHW-2, 90C	3/4" EMT	0.0	0.0%	720	20	19%
pm7	10	#12 AWG (L, N)	#12 AWG	120v (L-N)	(Cu) XHHW-2, 90C	3/4" EMT	0.0	0.0%	180	20	10%
commlink	10	#12 AWG (L, N)	#12 AWG	120v (L-N)	(Cu) XHHW-2, 90C	3/4" EMT	0.0	0.0%	180	20	10%
das-also	10	#12 AWG (L, N)	#12 AWG	120v (L-N)	(Cu) XHHW-2, 90C	3/4" EMT	0.0	0.0%	180	20	10%
recept.	10	#12 AWG (L, N)	#12 AWG	120v (L-N)	(Cu) XHHW-2, 90C	3/4" EMT	0.0	0.0%	180	20	10%

Wire Tag	Wire Run (ft)	Wire Size	EGC	Conduit Size	Conductor Type	Vdrop (Volts)	Vdrop (%)	Modules Connected	Strings Combined	Imp (Amps DC)	Isc (Amps DC)	Isc*1.25	Isc*1.56	OCPD (Amps DC)	Cond. Fill (%)	75C Wire Ampacity (Amps)	90C Wire Ampacity (Amps)	Ampacity Derate (fraction)	Derated Wire Ampacity (Amps)	
Inv #1	cb-1	1128	500 kcmil (Al)	1 AWG (Al)	3" PVC Sch.40	PV XLPE, 90C	9.2	0.9%	308	11	96.2	99.6	124.4	156	315	23%	310	350	0.96	336
	cb-2	1036	600 kcmil (Al)	1 AWG (Al)	3.5" PVC Sch.40	PV XLPE, 90C	14.1	1.3%	616	22	192.4	199.1	248.9	311	315	21%	340	385	0.96	370
	cb-3	956	600 kcmil (Al)	1 AWG (Al)	3.5" PVC Sch.40	PV XLPE, 90C	12.4	1.2%	588	21	183.6	190.1	237.6	297	315	23%	310	350	0.96	370
	cb-4	857	600 kcmil (Al)	1 AWG (Al)	3.5" PVC Sch.40	PV XLPE, 90C	10.1	1.0%	532	19	166.2	172.0	214.9	269	315	23%	310	350	0.96	370
								2044	73	638	661	826								
Inv #2	cb-5	823	500 kcmil (Al)	1 AWG (Al)	3" PVC Sch.40	PV XLPE, 90C	8.5	0.8%	392	14	122.4	126.7	158.4	198	315	23%	310	350	0.96	336
	cb-6	681	500 kcmil (Al)	1 AWG (Al)	3" PVC Sch.40	PV XLPE, 90C	10.6	1.0%	588	21	183.6	190.1	237.6	297	315	23%	310	350	0.96	336
	cb-7	619	500 kcmil (Al)	1 AWG (Al)	3" PVC Sch.40	PV XLPE, 90C	7.8	0.7%	476	17	148.7	153.9	192.3	240	315	23%	310	350	0.96	336
	cb-8	484	500 kcmil (Al)	1 AWG (Al)	3" PVC Sch.40	PV XLPE, 90C	7.5	0.7%	588	21	183.6	190.1	237.6	297	315	23%	310	350	0.96	336
								2044	73	638	661	826								
Inv #3	cb-9	510	500 kcmil (Al)	1 AWG (Al)	3" PVC Sch.40	PV XLPE, 90C	6.8	0.6%	504	18	157.4	162.9	203.6	255	315	23%	310	350	0.96	336
	cb-10	463	500 kcmil (Al)	1 AWG (Al)	3" PVC Sch.40	PV XLPE, 90C	6.5	0.6%	532	19	166.2	172.0	214.9	269	315	23%	310	350	0.96	336
	cb-11	415	500 kcmil (Al)	1 AWG (Al)	3" PVC Sch.40	PV XLPE, 90C	5.8	0.6%	532	19	166.2	172.0	214.9	269	315	23%	310	350	0.96	336
	cb-12	368	500 kcmil (Al)	1 AWG (Al)	3" PVC Sch.40	PV XLPE, 90C	5.2	0.5%	532	19	166.2	172.0	214.9	269	315	23%	310	350	0.96	336
								2100	75	656	679	848								
Inv #4	cb-13	339	500 kcmil (Al)	1 AWG (Al)	3" PVC Sch.40	PV XLPE, 90C	4.5	0.4%	504	18	157.4	162.9	203.6	255	315	23%	310	350	0.96	336
	cb-14	288	500 kcmil (Al)	1 AWG (Al)	3" PVC Sch.40	PV XLPE, 90C	3.6	0.3%	476	17	148.7	153.9	192.3	240	315	23%	310	350	0.96	336
	cb-15	250	600 kcmil (Al)	1 AWG (Al)	3.5" PVC Sch.40	PV XLPE, 90C	3.4	0.3%	616	22	192.4	199.1	248.9	311	315	21%	340	385	0.96	370
	cb-16	264	500 kcmil (Al)	1 AWG (Al)	3" PVC Sch.40	PV XLPE, 90C	3.5	0.3%	504	18	157.4	162.9	203.6	255	315	23%	310	350	0.96	336
								2100	75	656	679	848								
Str. Free Air	250	#10 AWG (Cu)	#6 AWG (Cu)	Free Air	PV XLPE, 90C	5.6	0.5%	27	1	8.7	9.05	11.3	14.1	15	-	50	55	0.71	39	
Str. in Cond.	150	#10 AWG (Cu)	#10 AWG (Cu)	2.5" PVC	PV XLPE, 90C	3.4	0.3%	108	6	8.7	9.05	11.3	14.1	15	17%	35	40	0.67	27	



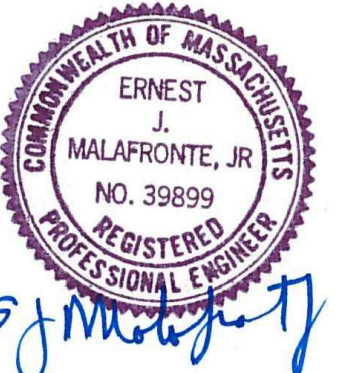
PARK AVENUE
SOLAR SOLUTIONS
102 GREENWICH AVE
GREENWICH, CT 06830
0203698-0090

STEM-DAS

sound solar systems LLC
supplying sustainable energy
ONE PARK AVE
OLD GREENWICH, CT 06870
0203698-0050

NEW MARLBOROUGH II
SINGLE LINE DIAGRAM - LV
PV SOLAR GROUND ARRAY
646 MILL RIVER SOUTHFIELD ROAD
NEW MARLBOROUGH, MA 01230

STAMP:



DATE:	COMMENT:
11.20.18	STORAGE
04.30.19	ESS
01.30.20	UTILITY REVIEW
03.09.20	PERMIT SET
JOB #	NEW MARLBOROUGH
DRWN	SD
CHKD	SG
SCALE	N.T.S
DATE	09-25-2017

E-2A

ELECTRICAL GENERAL NOTES

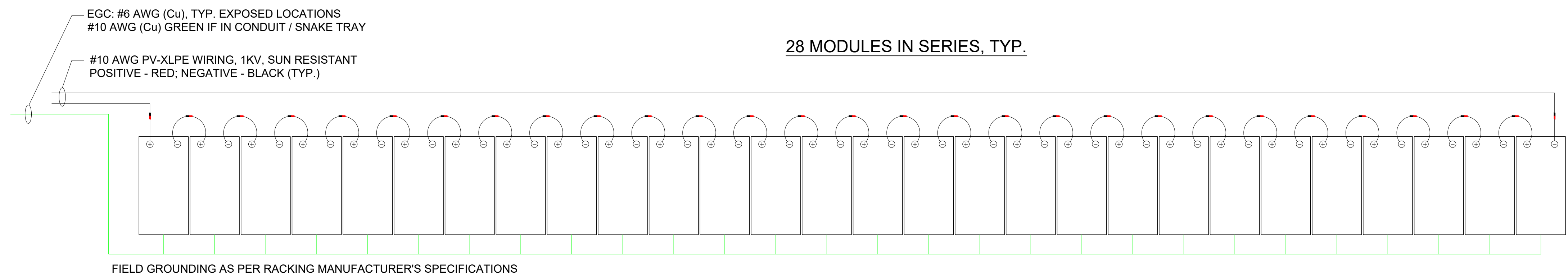
1. REFER TO SITE PLAN FOR EXACT LOCATIONS OF ALL EQUIPMENT.
2. ENTIRE INSTALLATION, INCLUDING MATERIALS, EQUIPMENT AND WORKMANSHIP, SHALL CONFORM WITH THE LATEST LOCAL ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE (NEC 2020), WITH ALL APPLICABLE LAWS, LOCAL CODES AND REGULATIONS AND REGULATORY BODIES HAVING JURISDICTION OVER THIS WORK.
3. ENTIRE SITE SHALL BE ENCLOSED BY FENCE AND ONLY ACCESSIBLE BY QUALIFIED PERSONNEL.
4. ALL OUTDOOR ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN NEMA 3R ENCLOSURE, UNLESS NOTED OTHERWISE (SCADA - NEMA 4).
5. ELECTRICAL CONTRACTOR SHALL EXAMINE THE DRAWINGS OF ALL TRADES AND COORDINATE THEIR WORK TO AVOID INTERFERENCE WITH STRUCTURE.
6. THE CONTRACTOR SHALL VISIT THE SITE AND VERIFY ALL DIMENSIONS AND CONDITIONS AT THE SITE BEFORE SUBMITTING BID AND/OR PROCEEDING WITH THE INSTALLATION.
7. ALL PV ELECTRICAL WIRING UNLESS OTHERWISE NOTED SHALL BE 1,000V/2,000V-90°C PV WIRE IN CONDUIT AS SPECIFIED ON DRAWINGS.
8. ELECTRICAL CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR ALL ELECTRICAL EQUIPMENT AND COMPONENTS HE PROVIDES. PROVIDE ELECTRONIC PDF SETS OF DRAWINGS TO THE ENGINEER.
9. THE WORD "PROVIDE" AS USED WITHIN THESE CONTRACT DOCUMENTS SHALL MEAN TO: "PROVIDE AND INSTALL".
10. OBTAIN ALL REQUIRED STATE AND LOCAL MUNICIPALITY/CITY PERMITS FOR ALL ELECTRICAL WORK.
11. OBTAIN SERVICES OF AN INDEPENDENT INSPECTION AGENCY TO INSPECT ALL ELECTRICAL WORK.
12. ALL NEW ELECTRICAL MATERIAL AND EQUIPMENT SHALL BE LISTED BY THE UNDERWRITERS' LABORATORIES, INC. (UL) AND BEAR THE UL LABEL.
13. ELECTRICAL RACEWAY CONNECTIONS TO VIBRATING EQUIPMENT AND MACHINERY SUCH AS MOTORS, TRANSFORMERS, ETC. SHALL BE MADE WITH FLEXIBLE METAL CONDUIT.
14. PROVIDE GROUNDING IN ACCORDANCE WITH NEC ARTICLES 250 AND 690. UNLESS NOTED OTHERWISE, ALL GROUNDING WIRE, LUGS, FEEDER AND BUS SHALL BE COPPER. ALL BRANCH CIRCUIT WIRING SHALL CONTAIN A COPPER GROUNDING WIRE. NO FLEXIBLE METAL CONDUIT OF ANY KIND SHALL BE USED AS THE EQUIPMENT GROUNDING CONDUCTOR.
15. PROVIDE IDENTIFICATION PLATES ON ALL ELECTRICAL EQUIPMENT INCLUDED IN THIS PROJECT AND EQUIPMENT FURNISHED BY OTHERS. ATTACH WITH SUITABLE ADHESIVE. PROVIDE IDENTIFICATION FOR ALL TRANSFORMERS, DISCONNECTS, CIRCUIT BREAKERS, COMBINER BOXES, JUNCTION BOXES, PANELS, ETC.
16. PROVIDE TYPEWRITTEN PANEL CIRCUIT DIRECTORIES FOR EACH COMBINER BOX INSTALLED. LABEL AND IDENTIFY ALL D.C. CKTS. IN ADDITION TO A/C CIRCUITS.
17. DURING CONSTRUCTION, THE CONTRACTOR SHALL MAINTAIN A RECORD SET OF INSTALLATION PRINTS. THE CONTRACTOR SHALL NEATLY AND CLEARLY RECORD ALL DEVIATIONS FROM THE CONTRACT DOCUMENTS. AT THE COMPLETION OF WORK, THE CONTRACTOR SHALL RETURN THE MARKED PRINTS WITH ALL INFORMATION MAINTAINED DURING CONSTRUCTION TO THE ENGINEER FOR SUBMISSION TO THE OWNER.
18. SEAL INSIDE OF ALL CONDUITS AT ENCLOSURES WITH SEALING COMPOUND, DUCT SEAL OR SIMILAR.
19. ALL CONDUIT COMING FROM UNDERGROUND TO ABOVE GROUND ENCLOSURE SHALL HAVE SLIP JOINT RISER INSTALLED.
20. SUBMIT AN RFI FOR ANY CONFLICTING SPECIFICATIONS, NOTES OR DETAILS.

PARK AVENUE
SOLAR SOLUTIONS
102 GREENWICH AVE
GREENWICH, CT 06830
12031698-0090

STEM -
DAS

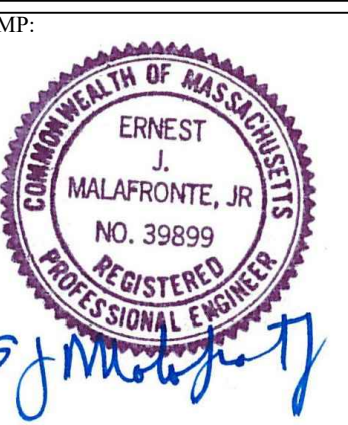


NEW MARLBOROUGH II
ELECTRICAL
PV SOLAR GROUND ARRAY
646 MILL RIVER SOUTHFIELD ROAD
NEW MARLBOROUGH, MA 01230



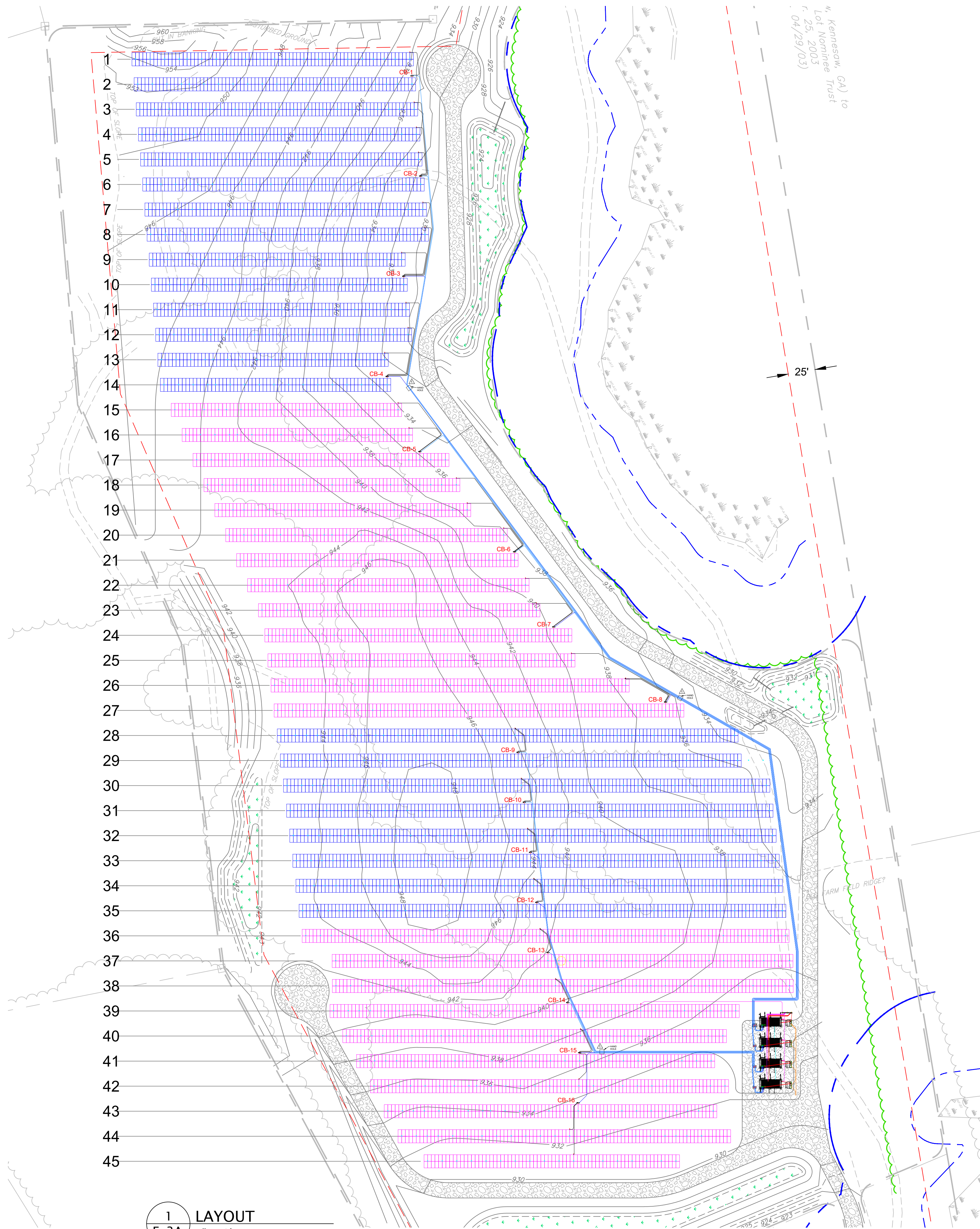
28 MODULES IN SERIES, TYP.

1 TYPICAL STRING
E-2B NTS

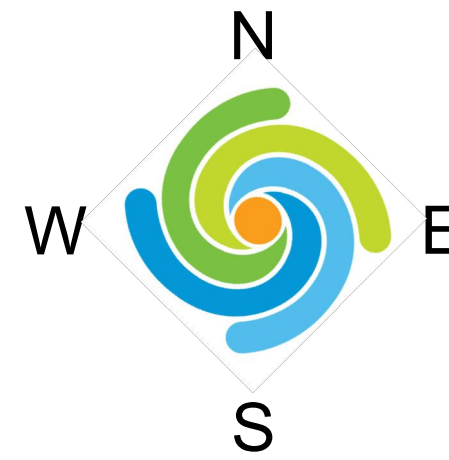


REVISIONS	
DATE:	COMMENT
11.20.18	STORAGE
04.30.19	ESS
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CHKD	SG
SCALE	N.T.S
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E-2B



W. Kennesaw, GA) to
 Lot Nominee Trust
 c. 25, 2003
 04/29/03



25'

Row #	Modules Qty	Strings Qty	CB-/WH*	Inverter #
1	154	5.5	WH	Inv #1
2	154	5.5	CB-1	
3	154	5.5	WH	
4	154	5.5	WH	
5	154	5.5	WH	
6	154	5.5	CB-2	
7	154	5.5	WH	
8	154	5.5	WH	
9	140	5.0	WH	
10	140	5.0	CB-3	
11	140	5.0	WH	
12	140	5.0	WH	
13	126	4.5	WH	
14	126	4.5	CB-4	
15	126	4.5	WH	
16	126	4.5	WH	
17	140	5.0	CB-5	
18	140	5.0	WH	
19	140	5.0	WH	
20	154	5.5	WH	
21	154	5.5	CB-6	
22	154	5.5	WH	
23	154	5.5	WH	
24	168	6.0	CB-7	
25	168	6.0	WH	
26	196	7.0	WH	
27	224	8.0	CB-8	
28	252	9.0	WH	
29	252	9.0	CB-9	
30	266	9.5	WH	
31	266	9.5	CB-10	
32	266	9.5	WH	
33	266	9.5	CB-11	
34	266	9.5	WH	
35	266	9.5	CB-12	
36 (PARTIAL)	14	0.5	WH (TO CB-15)	
36 (PARTIAL)	252	9.0	WH	
37	252	9.0	CB-13	
38	252	9.0	WH	
39	224	8.0	14	
41	210	7.5	WH	
41	196	7.0	CB-15	
42	196	7.0	WH	
43	182	6.5	CB-16	
44	182	6.5	WH	
45	140	5.0	WH	
8,288	296			

*CB = COMBINER BOX; WH = WEATHERHEAD

HANDHOLE SCHEDULE:

- 1. HANDHOLE 48"x48" (DC FEEDERS), 3 UNITS
- LOADING: TIER 15, NON DELIBERATE HEAVY VEHICULAR TRAFFIC
- OLDCASTLE PLYMER H-SERIES 4848-24 OR SIMILAR
- MARKING: ELECTRIC (1,000V DC)

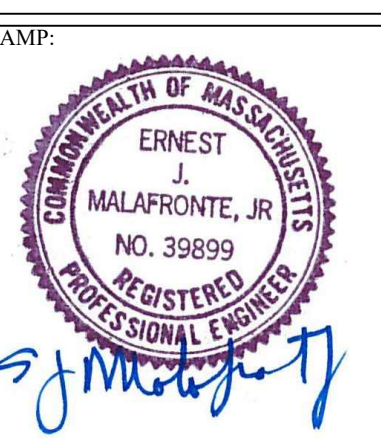
1 LAYOUT
 E-3A 1"=50'

PARK AVENUE
 SOLAR SOLUTIONS
 102 GREENWICH AVE
 GREENWICH, CT 06830
 (203)698-0090

STEM -
 DAS



NEW MARLBOROUGH II
 LAYOUT
 PV SOLAR GROUND ARRAY
 646 MILL RIVER SOUTHFIELD ROAD
 NEW MARLBOROUGH, MA 01230

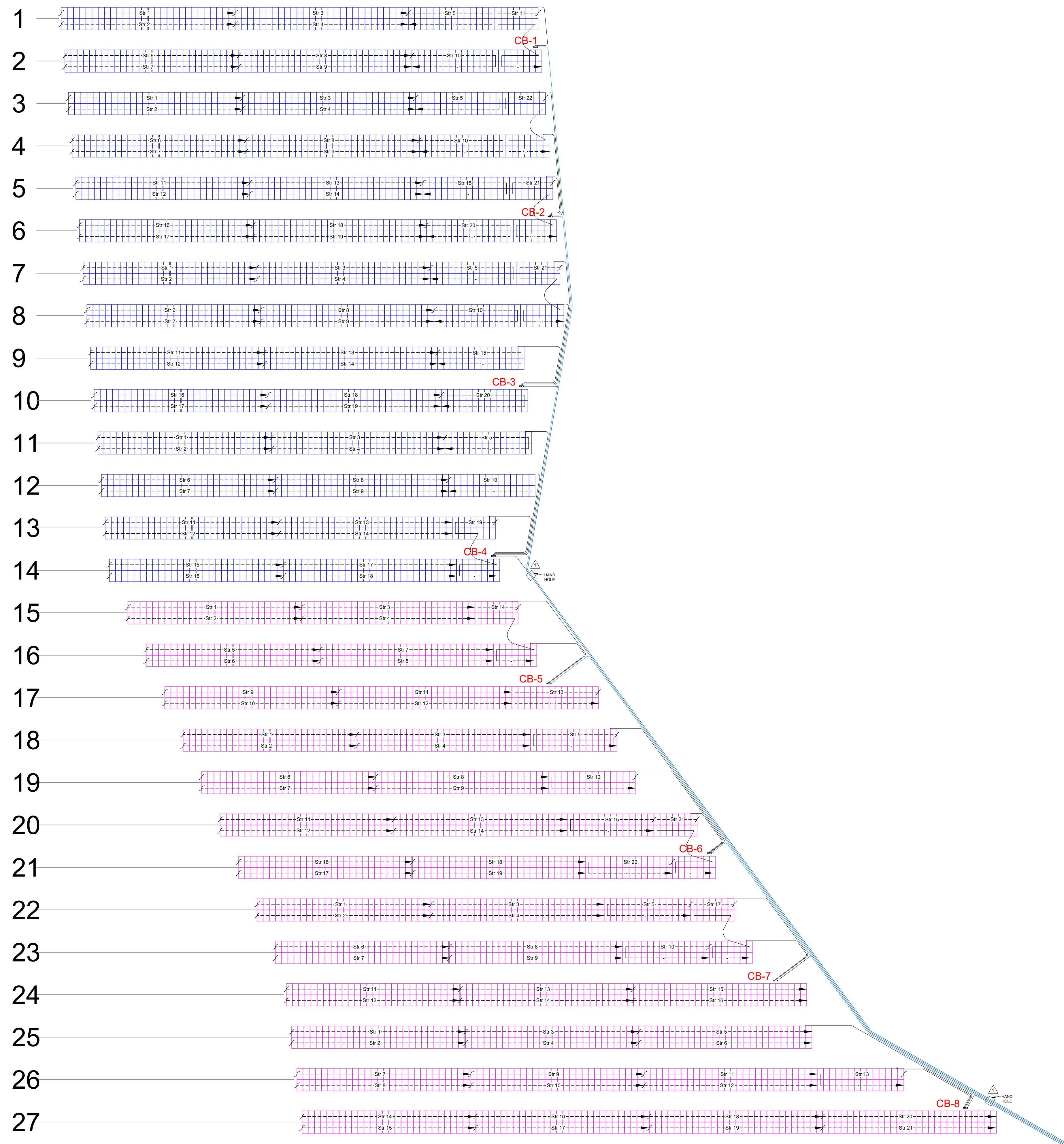


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E-3A



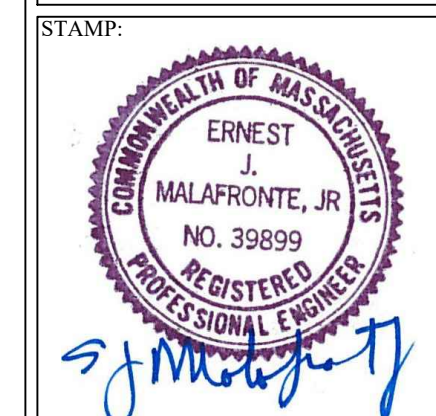
1 STRINGS
E-3B 1"=30'

PARK AVENUE
SOLAR SOLUTIONS
102 GREENWICH AVE
GREENWICH, CT 06830
2033698-0090

STEM -
DAS

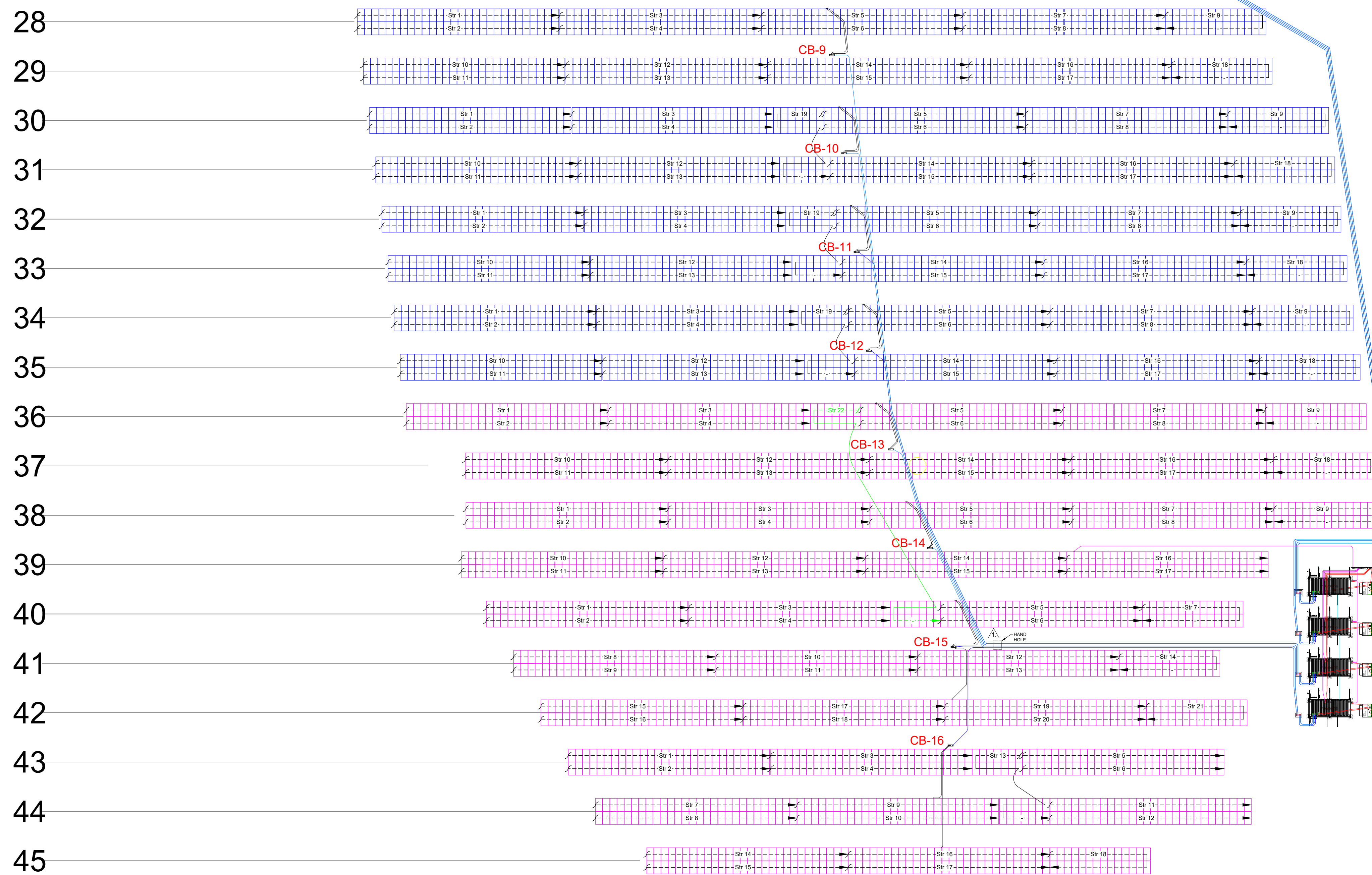


NEW MARLBOROUGH II
STRINGS
PV SOLAR GROUND ARRAY
646 MILL RIVER SOUTHFIELD ROAD
NEW MARLBOROUGH, MA 01230



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E-3B



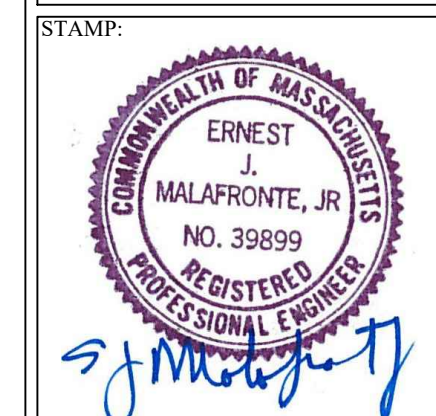
1 STRINGS
E-3C 1"=30'

PARK AVENUE
SOLAR SOLUTIONS
102 GREENWICH AVE
GREENWICH, CT 06830
12031698-0090

STEM -
DAS

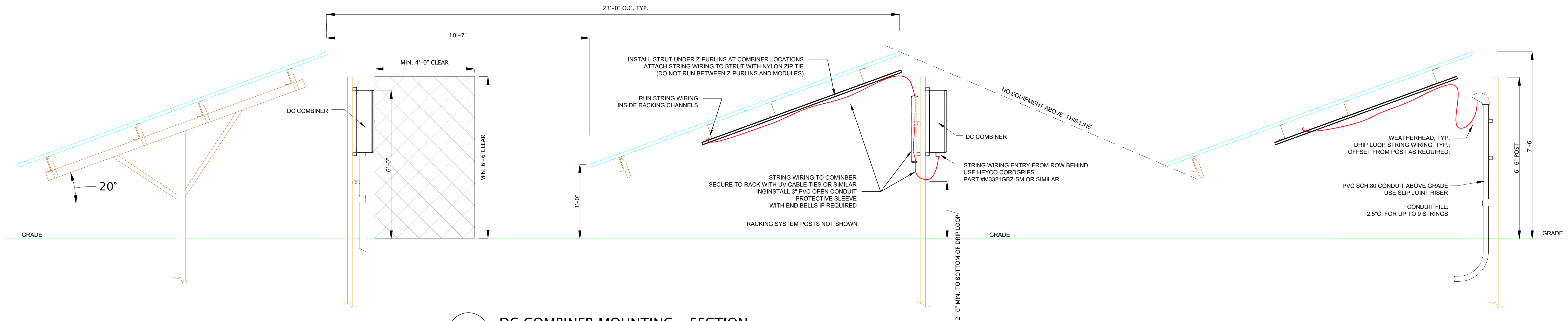


NEW MARLBOROUGH II
STRINGS
PV SOLAR GROUND ARRAY
646 MILL RIVER SOUTHFIELD ROAD
NEW MARLBOROUGH, MA 01230

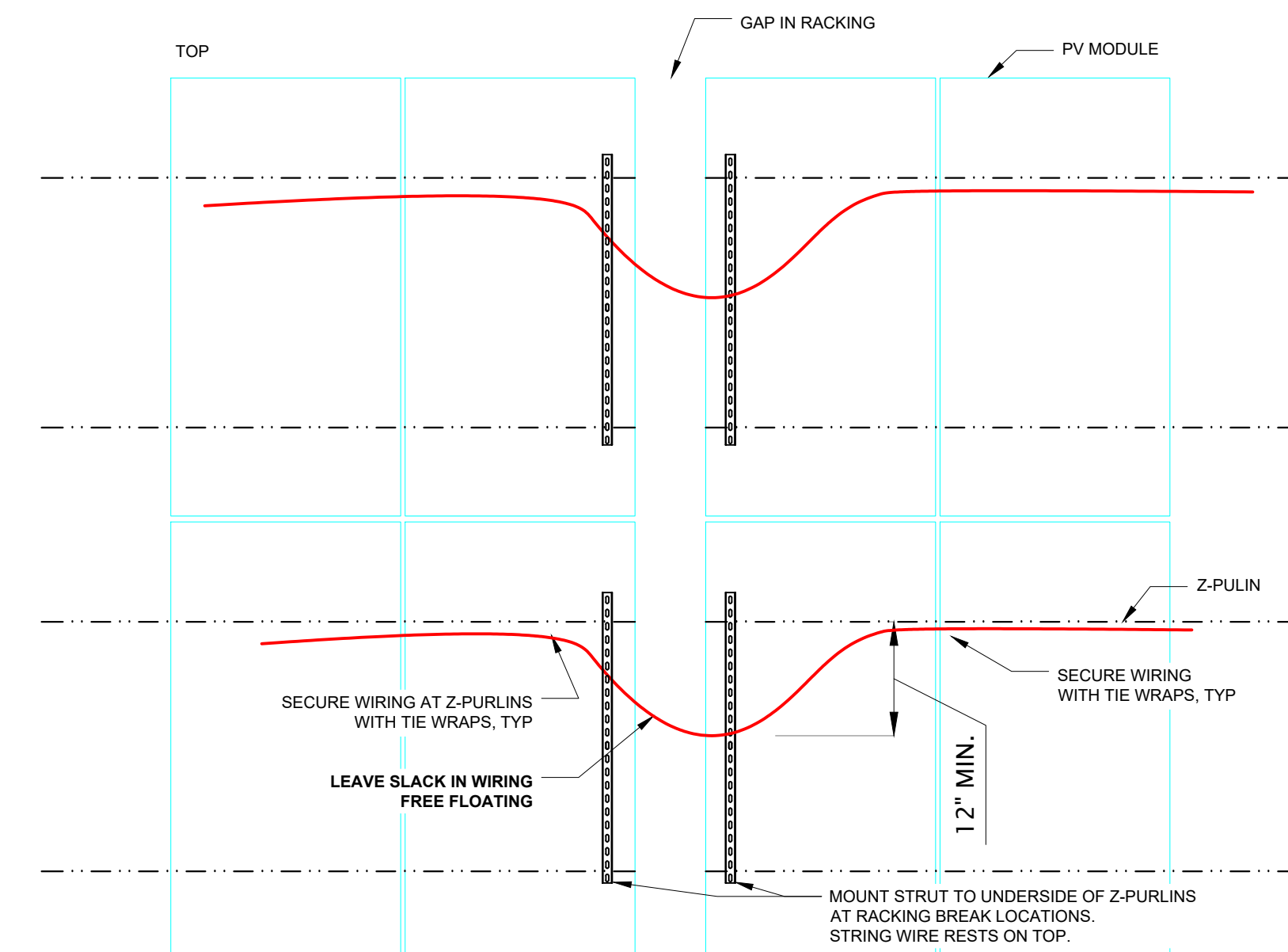


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01.30.20	UTILITY REVIEW
03.09.20	PERMIT SET
JOB #	NEW MARLBOROUGH
DRWN	SD
CHKD	SG
SCALE	N.T.S
DATE	09-25-2017

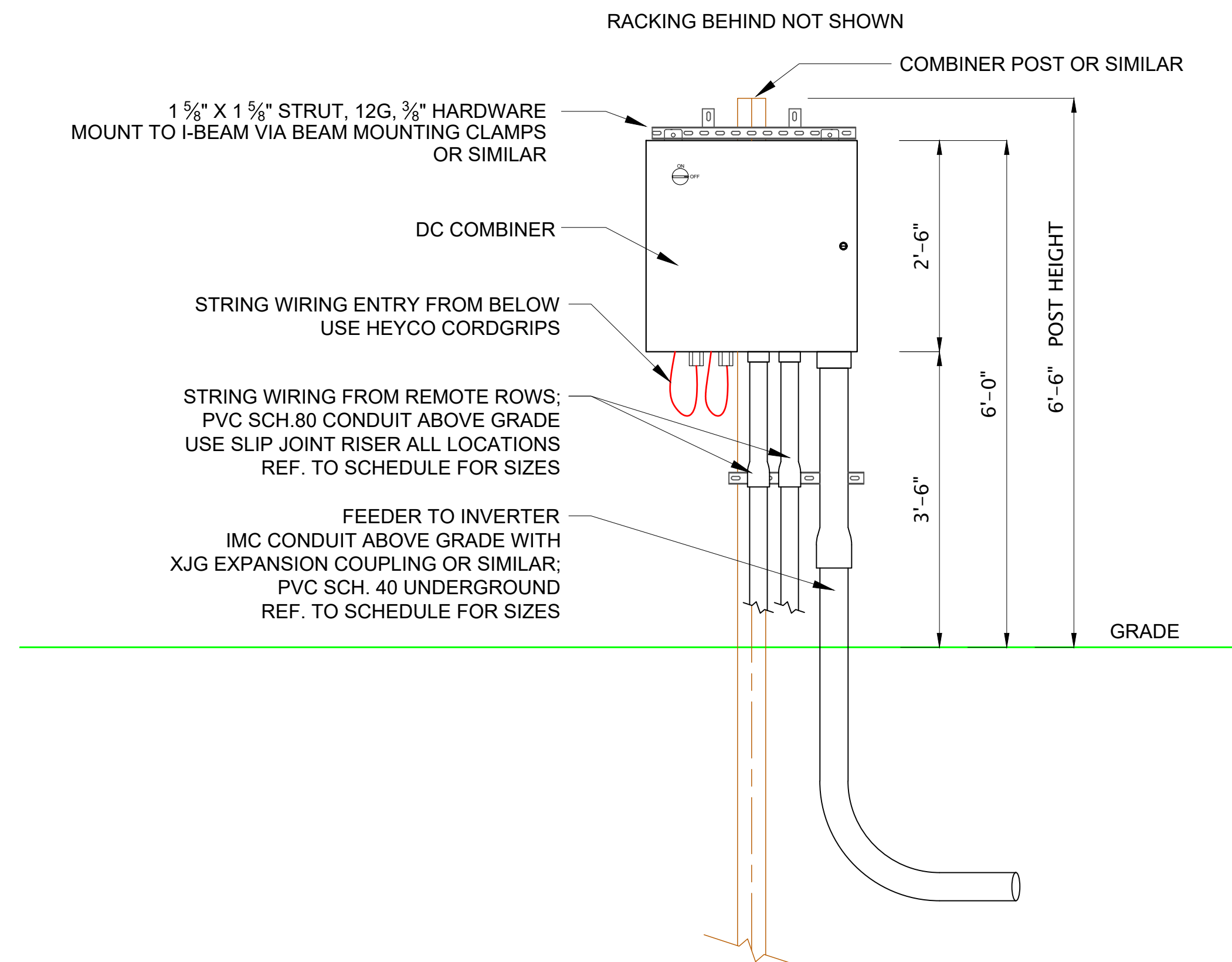
E-3C



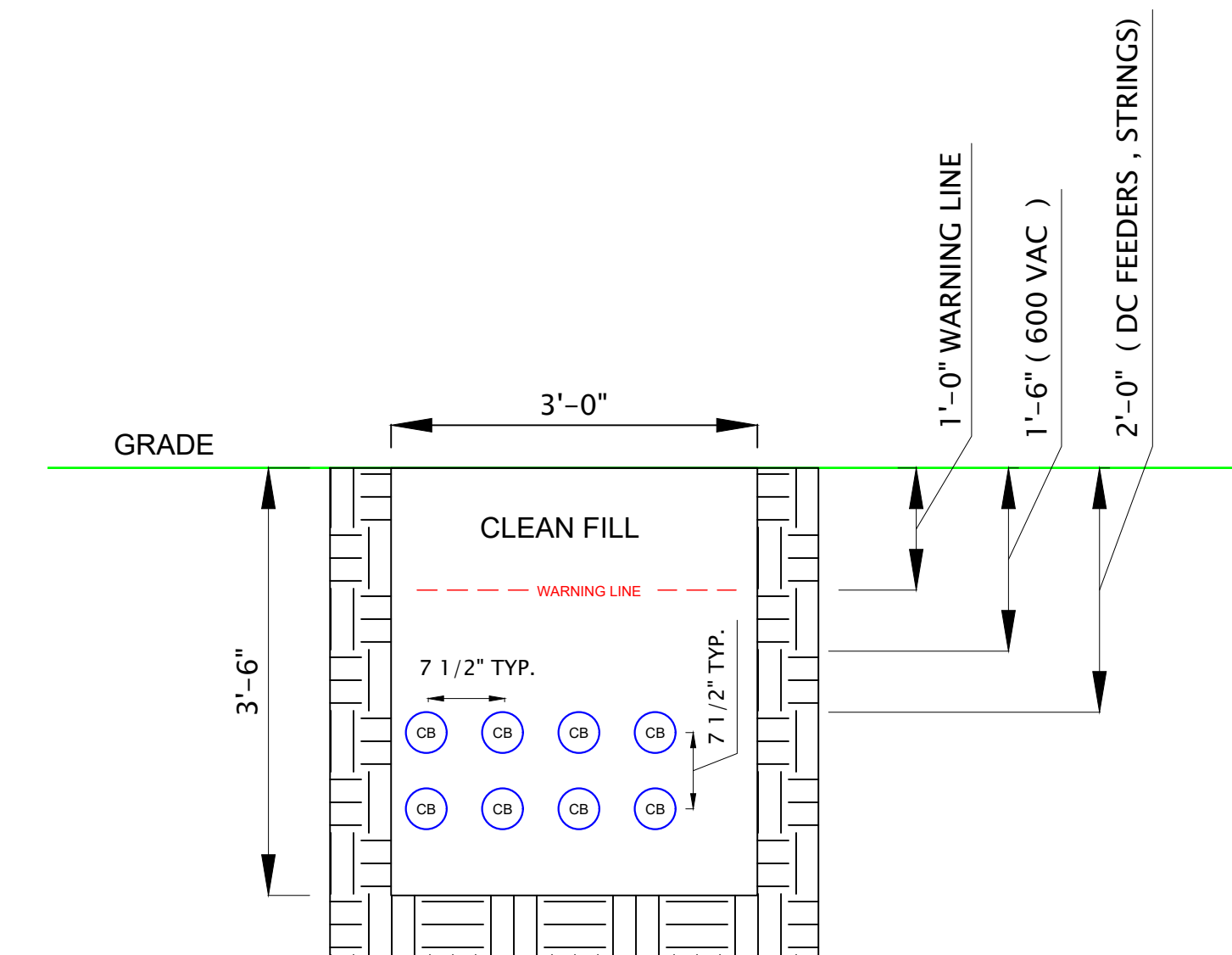
1 DC COMBINER MOUNTING - SECTION, TYP.
Scale: 1/2" = 1'-0"



4 WIRING AT ROW BREAKS, TYP.
Scale: 1/2" = 1'-0"

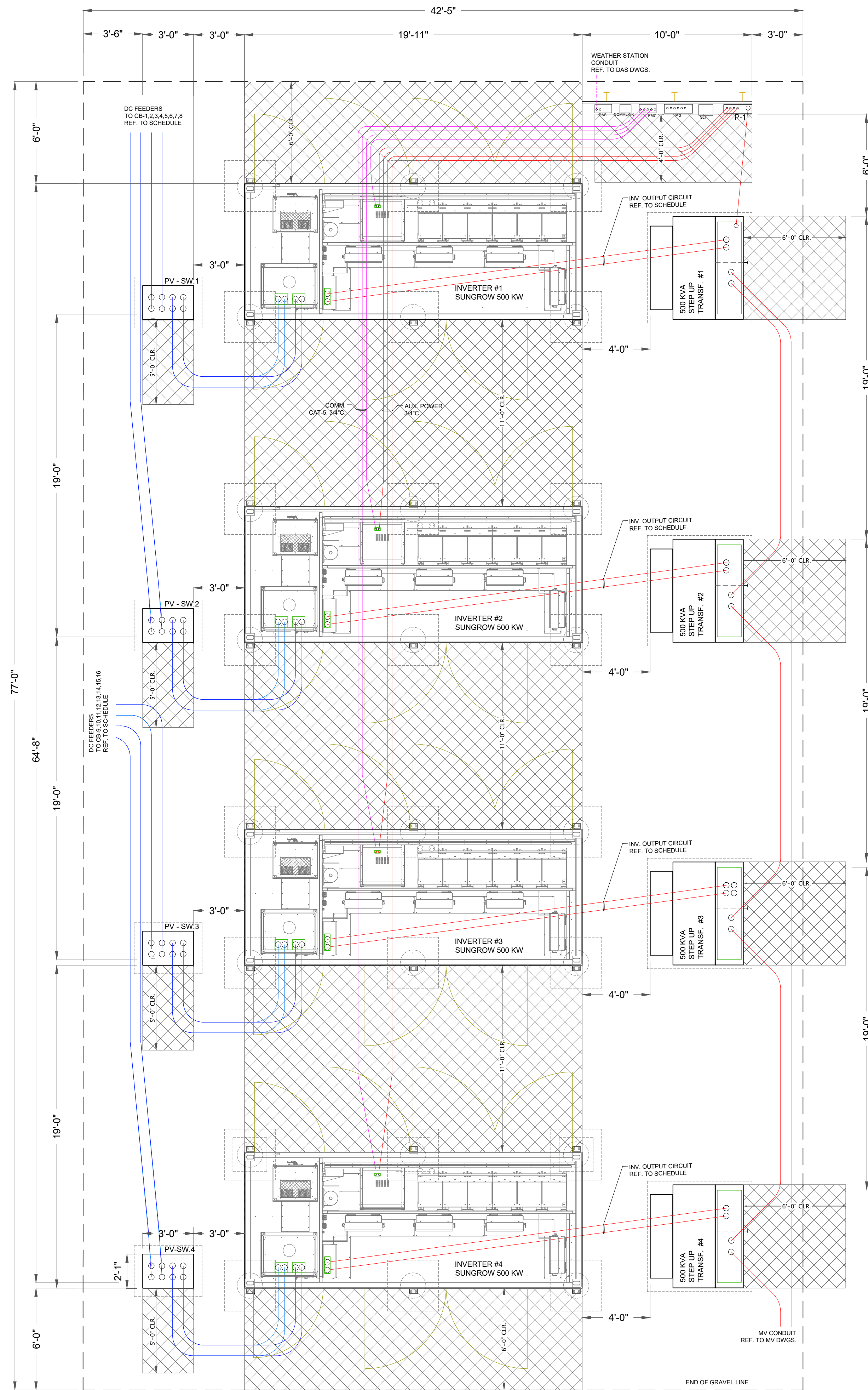


2 DC COMBINER MOUNTING - SECTION, TYP.
Scale: 3/4" = 1'-0"

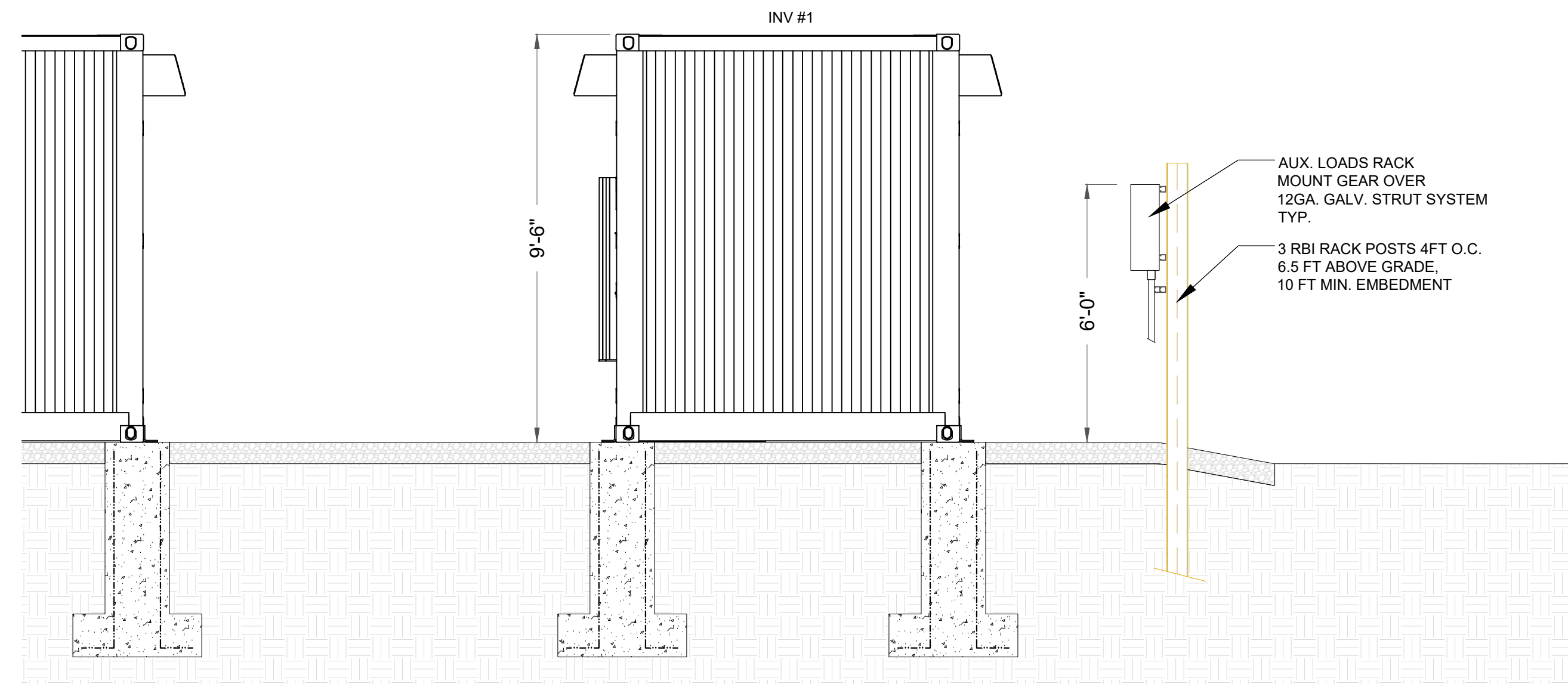


3 TRENCH DETAIL, TYP.
Scale: 3/4" = 1'-0"

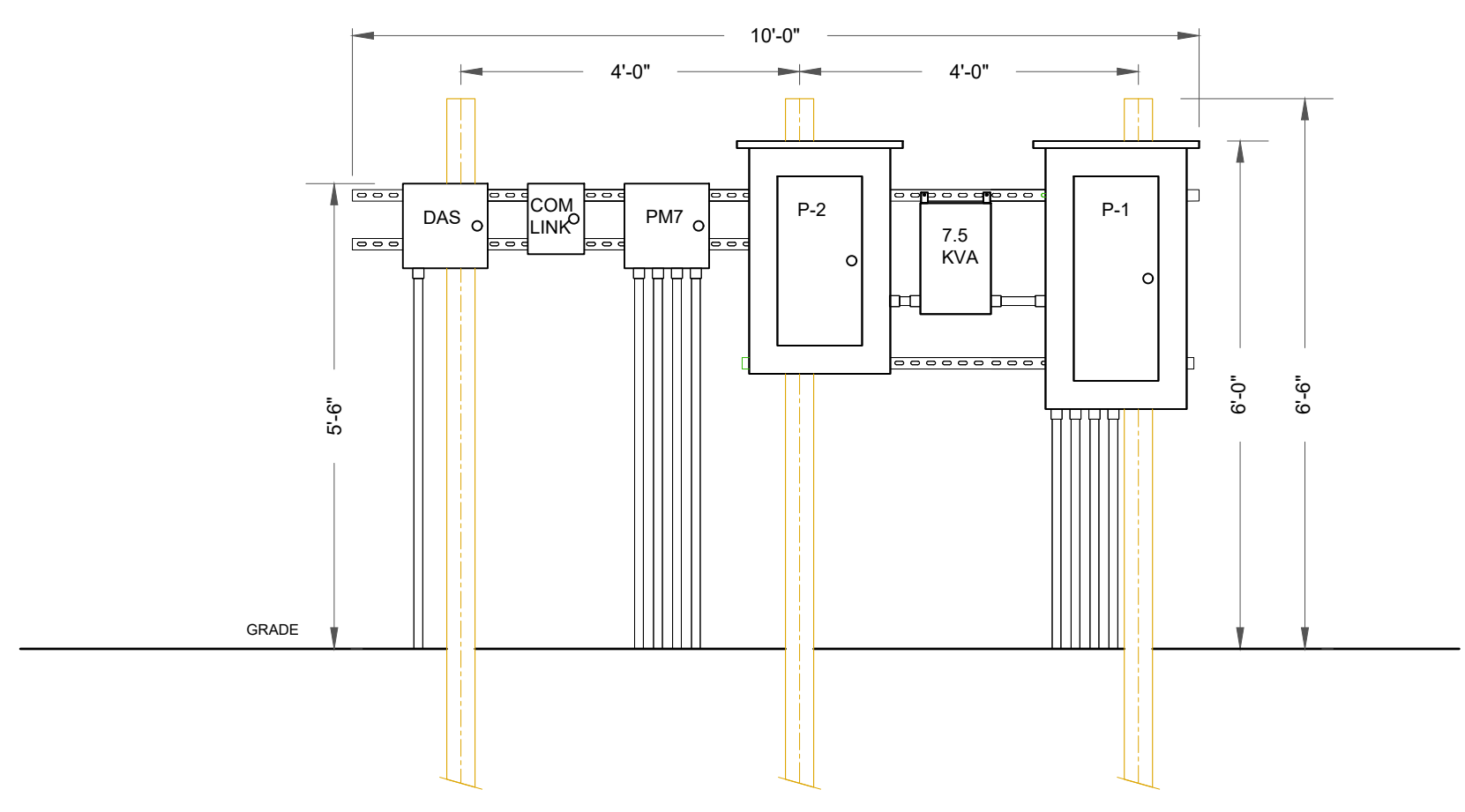
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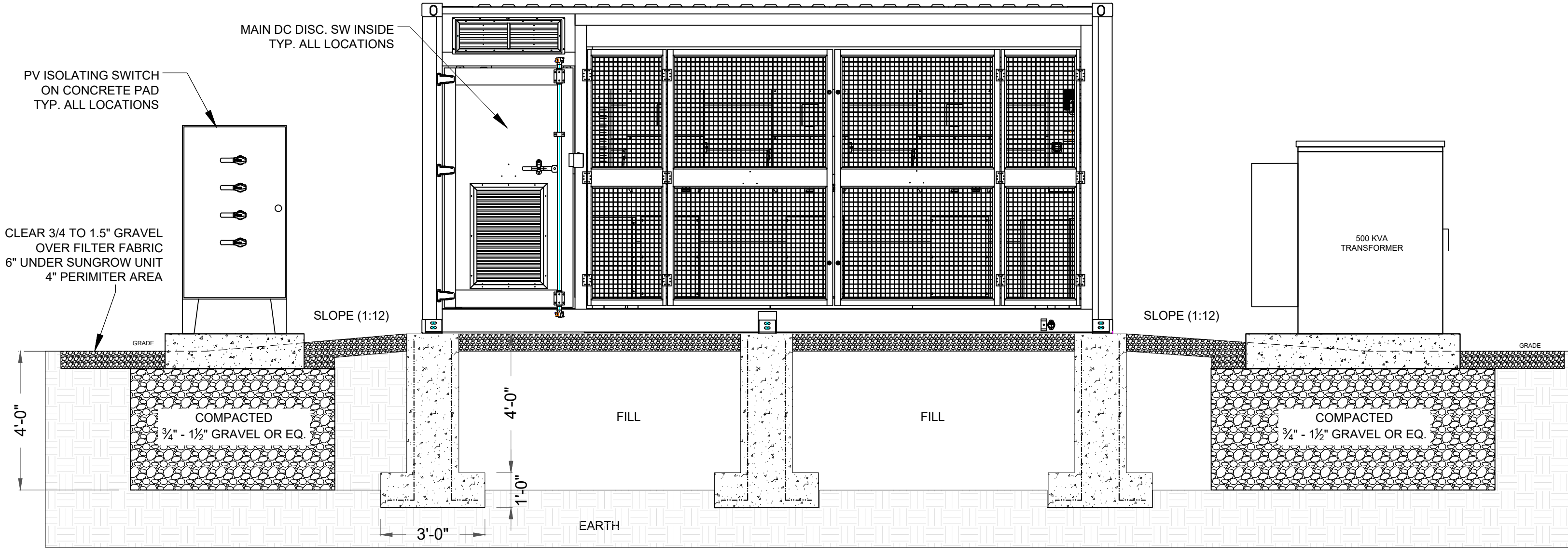
1 PAD, PLAN VIEW
E-5A
1/4" = 1'-0"



3 EAST ELEVATION - SECTION,
E-5A AUX. LOADS RACK
3/8" = 1'-0"



4 AUX LOADS RACK
E-5A
1/2" = 1'-0"



2 SOUTH ELEVATION - SECTION
E-5A
3/8" = 1'-0"

PARK AVENUE
SOLAR SOLUTIONS
102 GREENWICH AVE
GREENWICH, CT 06830
12033698-0090

STEM -
DAS

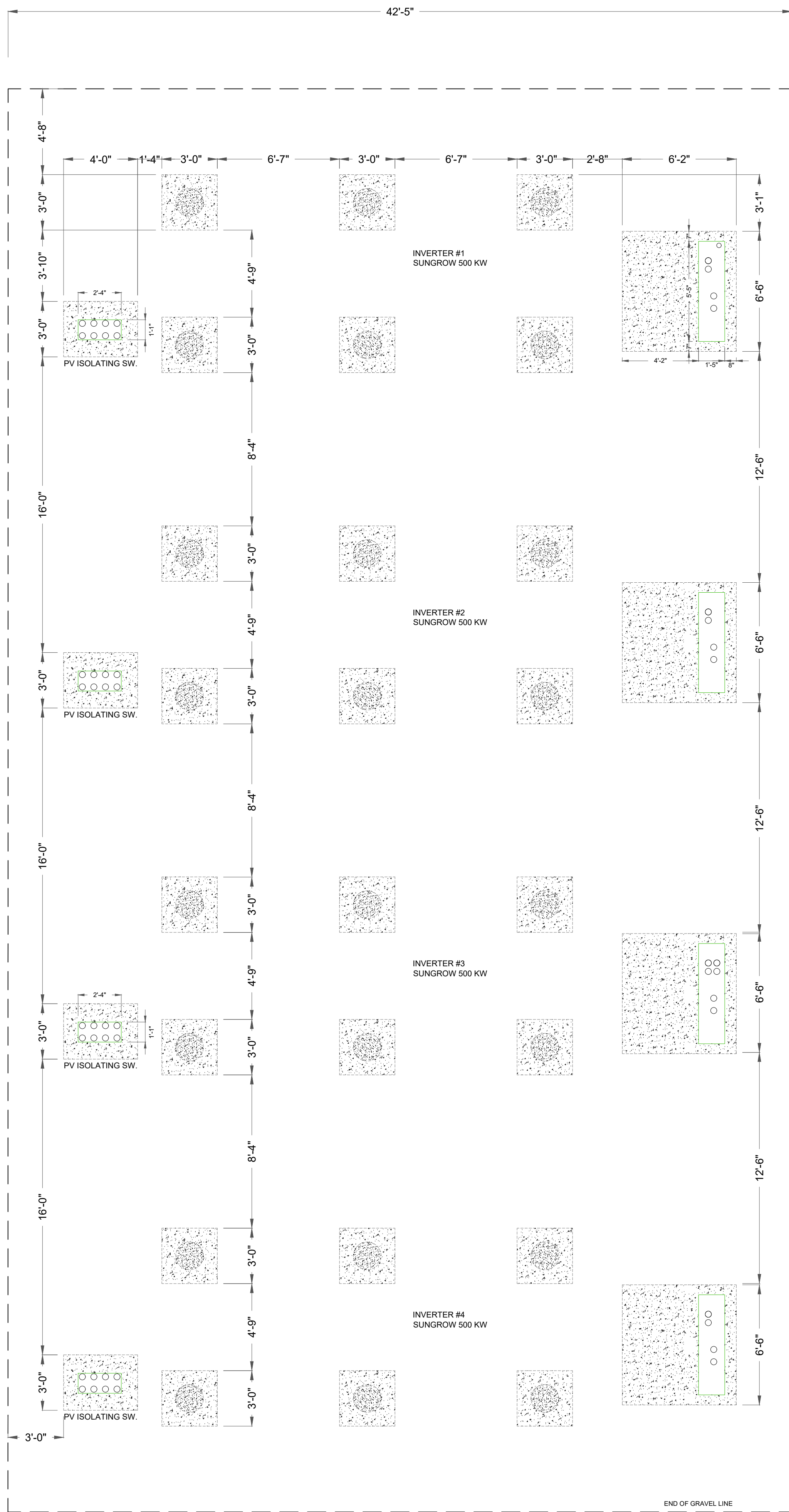
sound solar systems LLC
supplying sustainable energy
ONE PARK AVE
OLD GREENWICH, CT 06870
12033698-0050

NEW MARLBOROUGH II
PAD
PV SOLAR GROUND ARRAY
646 MILL RIVER SOUTHFIELD ROAD
NEW MARLBOROUGH, MA 01230

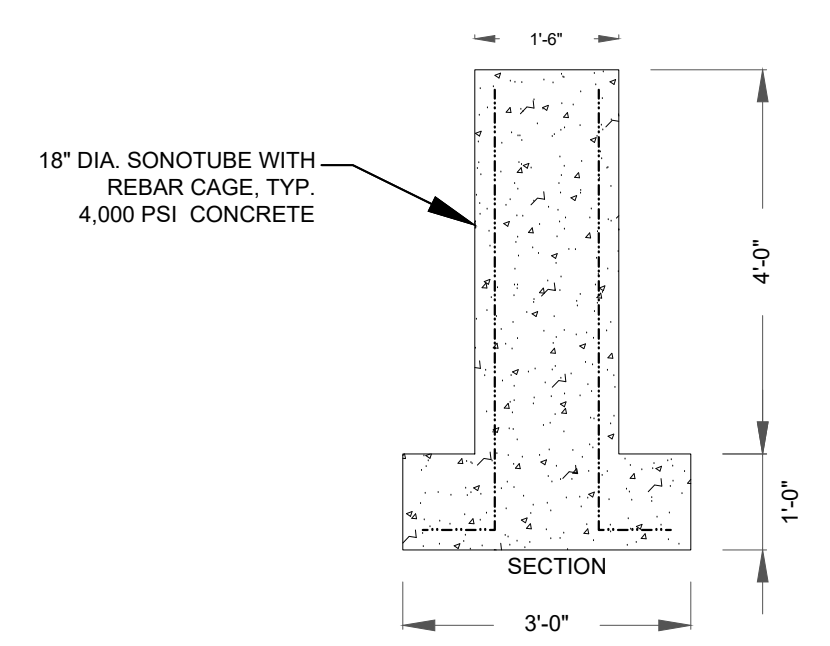
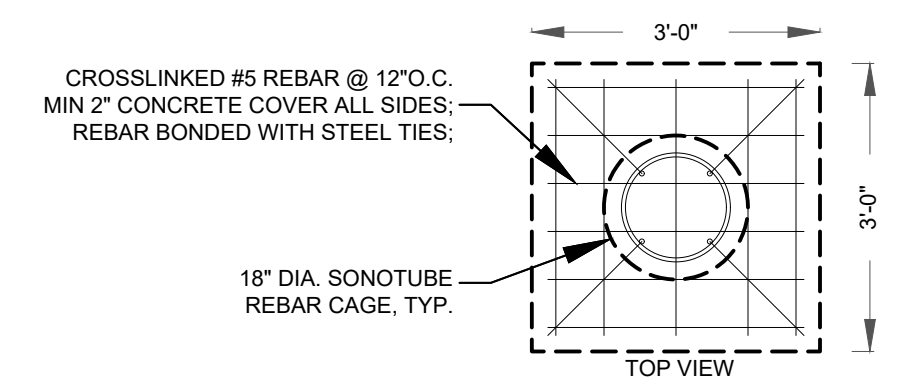
STAMP:
ERNEST J. MALAFRONTI, JR.
NO. 39899
REGISTERED PROFESSIONAL ENGINEER

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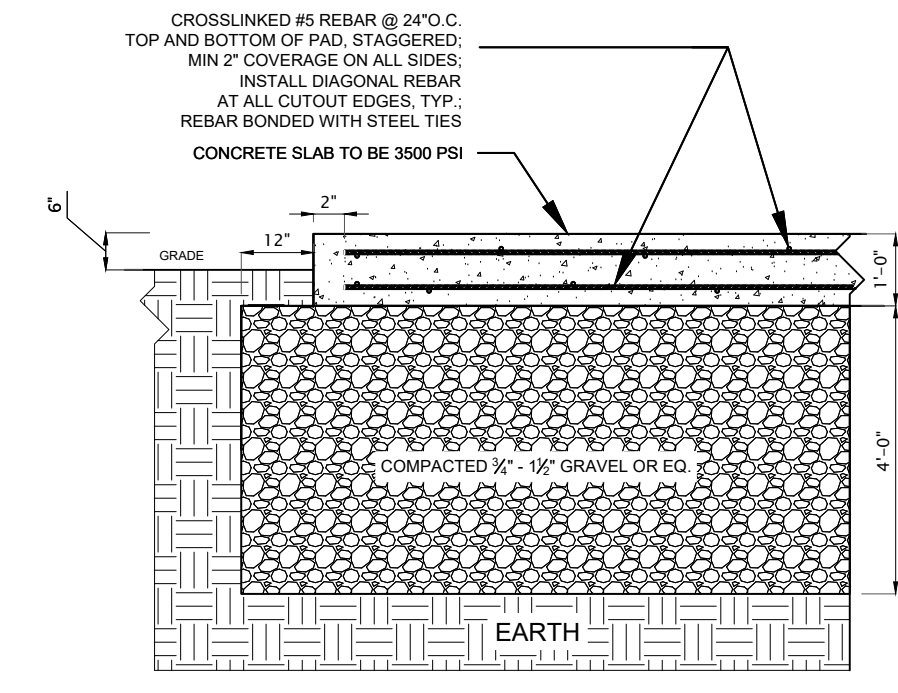
E-5A



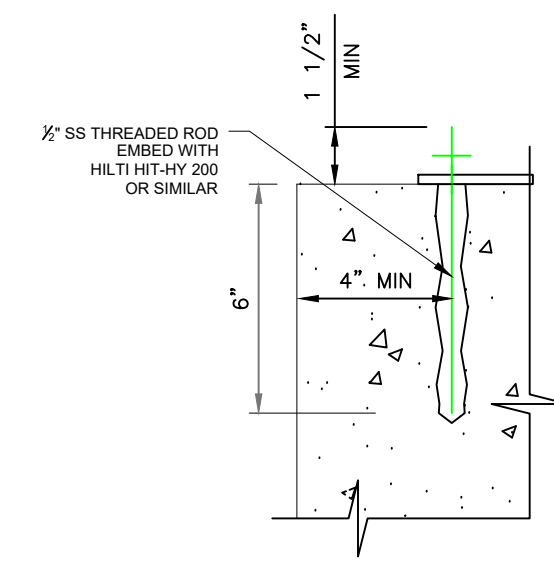
1
E-5B **PAD, PLAN VIEW**
1/4" = 1'-0"



2
E-5B **CONCRETE PIER DETAIL AT SUNGROW CONTAINER**
1/2" = 1'-0"



3
E-5B **EQUIPMENT PAD DETAIL**
1/2" = 1'-0"



4
E-5B **EQUIPMENT ANCHORAGE DETAIL, TYP.**
1/2" = 1'-0"

PARK AVENUE
SOLAR SOLUTIONS
102 GREENWICH AVE
GREENWICH, CT 06830
12031698-0090

STEM -
DAS

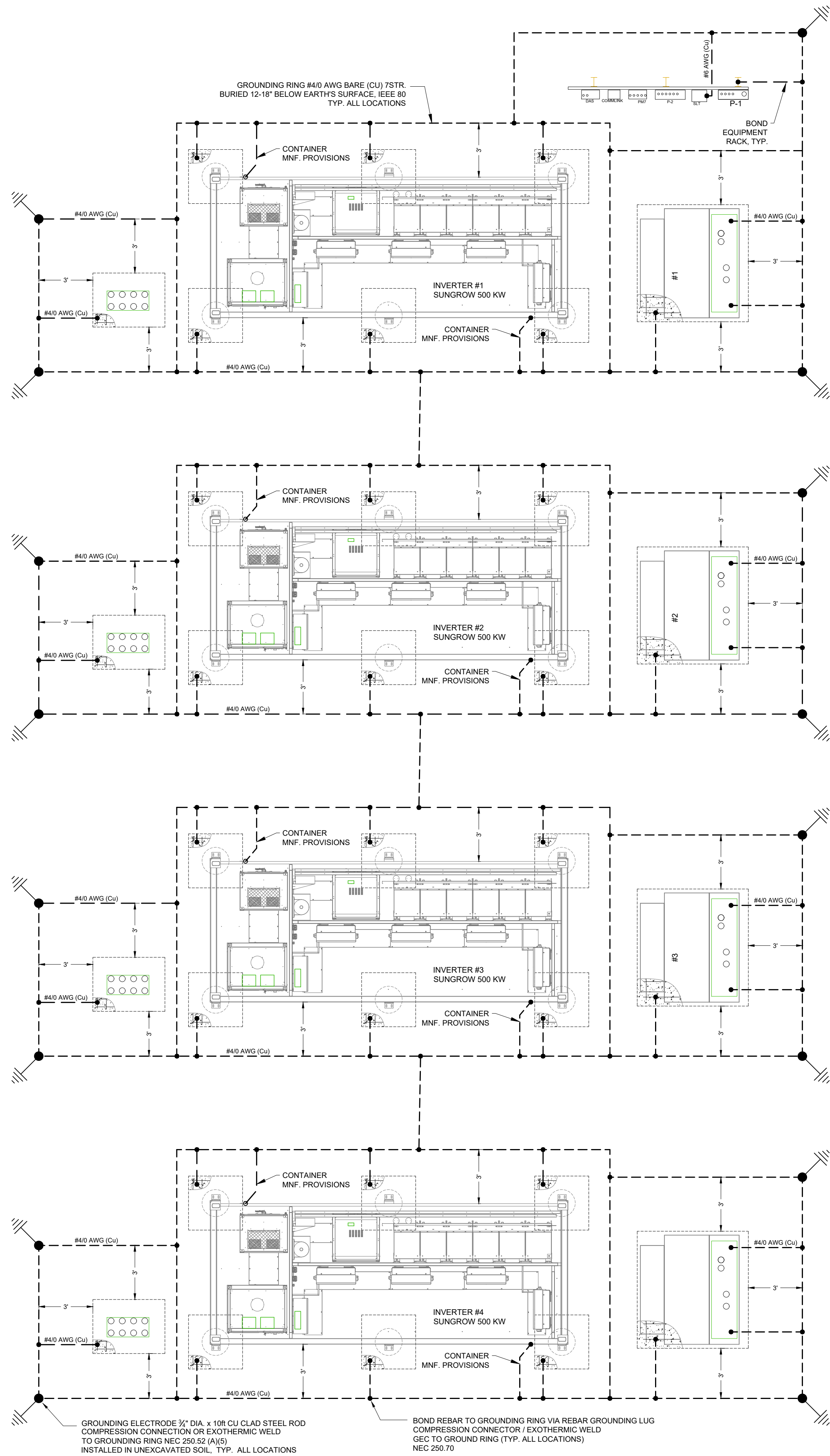
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12031698-0050

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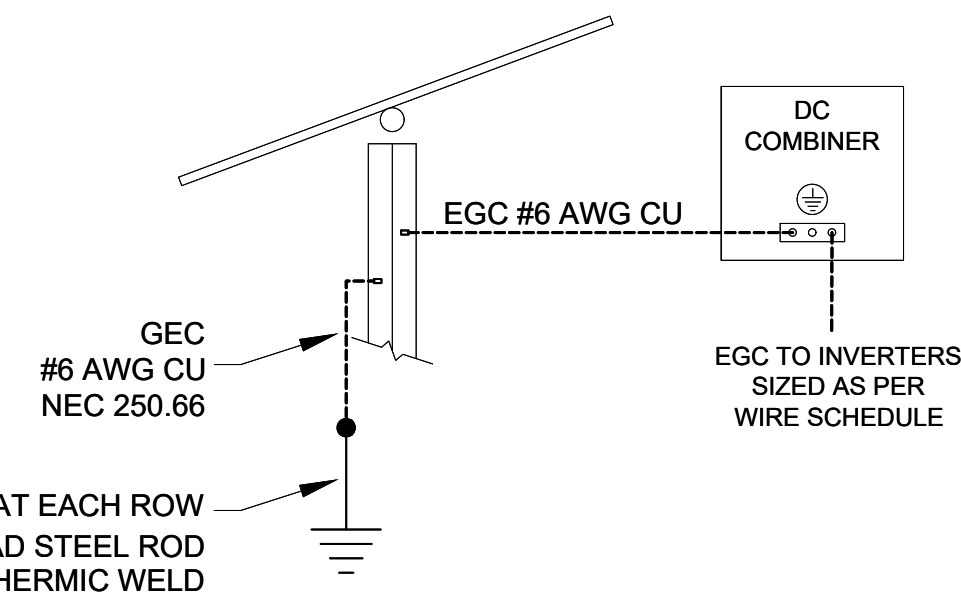
STAMP:
COMMONWEALTH OF MASSACHUSETTS
ERNEST J. MALAFRONTI, JR.
NO. 39899
REGISTERED PROFESSIONAL ENGINEER
E. J. Malafronti, Jr.

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E-5B

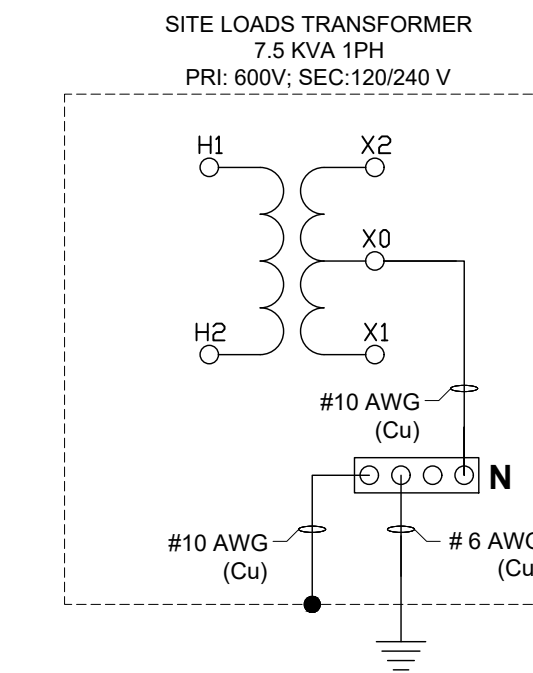


INSTALL GROUNDING ELECTRODE AT EACH ROW
 3/4" DIA. x 10ft CU CLAD STEEL ROD
 COMPRESSION CONNECTION OR EXOTHERMIC WELD

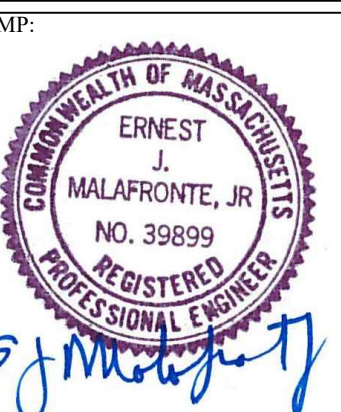


MODULE AND RACKING GROUNDING:

1. BONDING OF ALL RACKS, TRACKERS AND MODULES TO PROVIDE AN ELECTRICALLY CONTINUOUS SYSTEM
2. MODULE GROUNDING: USE WEEB CLAMPS AND/OR GROUNDING LUGS (DIRECT BURIAL RATED) OR SIMILAR AS PER RACKING AND MODULE MANUFACTURERS SPECIFICATIONS;
3. EGC: USE #6 AWG CU MIN. IN FIELD EXPOSED LOCATIONS; USE #10 AWG CU MIN. IN RACEWAYS
4. INSTALL 3/4" DIA. X 10ft CU CLAD STEEL ROD AT EACH ROW; BOND TO RACKING WITH #6AWG (CU) AS PER NEC250.66(A)
5. WHERE ROWS BREAK, INSTALL GROUNDING LUG WEEB-6.7 WITH #6 AWG (CU) OR SIMILAR WITH SUFFICIENT WIRE LENGTH FOR EXPANSION/CONTRACTION;



**SITE LOADS TRANSFORMER
 NEUTRAL GROUNDING**



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MONO **POLY**

HELIENE 72P

72-CELL POLYCRYSTALLINE MODULE



330 Wp
MAX POWER OUTPUT

17.2%
MAX EFFICIENCY

10 YEAR
PRODUCT WARRANTY

25 YEAR
LINEAR PERFORMANCE GUARANTEE

HELIENE INC. IS A PREMIER SOLAR MODULE MANUFACTURER, SERVICING THE GROWING SOLAR ENERGY MARKETS OF NORTH AMERICA.

COMBINING PROVEN EUROPEAN TECHNOLOGY WITH NORTH AMERICAN INGENUITY ALLOWS HELIENE TO MAKE A REAL COMMITMENT IN PROVIDING SMARTER ENERGY CHOICES FOR THE FUTURE.

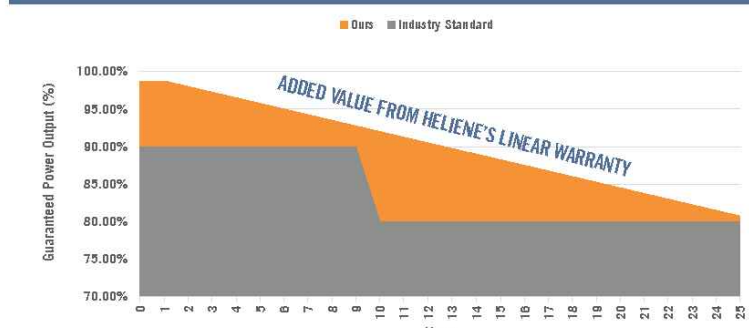
Helienne Inc.
www.helienne.com



- GUARANTEED POSITIVE POWER SORTING: [-0 : +4.99 WP]**
- AVAILABLE IN 1000V OR 1500V SYSTEM VOLTAGE RATING**
- MANUFACTURED ACCORDING TO INTERNATIONAL QUALITY SYSTEM STANDARDS: ISO9001**
- HI-BLACK INTEGRATION AVAILABLE (ALL-BLACK MODULE)**

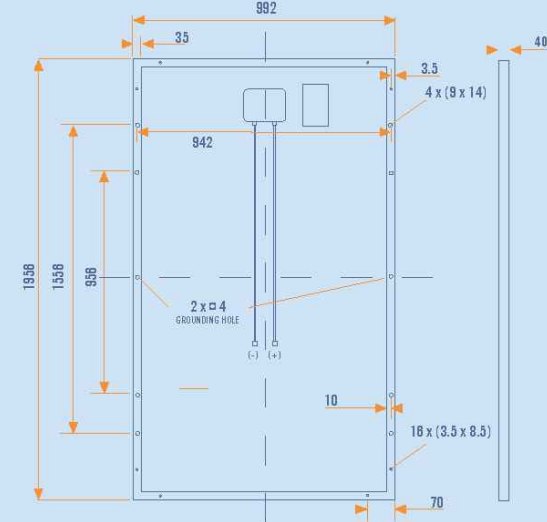
LINEAR PERFORMANCE GUARANTEE

10 YEAR WORKMANSHIP WARRANTY + 25 YEAR LINEAR PERFORMANCE GUARANTEE



72P

DIMENSIONS FOR HELIENE 72P SERIES MODULES



All measurement in mm, unless otherwise specified

ELECTRICAL DATA (STC)

Peak Rated Power	P_{max} (W)	338	325	320	315	310
Maximum Power Voltage	V_{mp} (V)	37.54	37.62	37.48	37.33	37.20
Maximum Power Current	I_{mp} (A)	8.83	8.743	8.64	8.50	8.40
Open Circuit Voltage	V_{oc} (V)	48.26	48.11	45.96	45.81	45.66
Short Circuit Current	I_{sc} (A)	8.13	8.05	8.97	8.89	8.81
Module Efficiency*	Eff (%)	16.8	16.3	16.8	16.5	16.2
Power Output Tolerance		[-0.8 : +4.99] Wp				

STC - Standard Test Conditions: Irradiation 1000 W/m² - Air mass AM 1.5 - Cell temperature 25 °C
* Calculated using maximum power based on full positive output tolerance [-0.8 : +4.99] Wp

MECHANICAL DATA

Dimensions (L x W x D)	1956 x 992 x 48 mm (77 x 39 x 1.8 inch)
Weight	23.6 kg (52.3 lbs)
Output Cables	1.1 m (43.3 inch) symmetrical cables with MC4 type connectors
Junction Box	IP-67 rated with bypass diodes
Frame	Double webbed 15 micron anodized aluminum alloy
Front Glass	Low-iron content, high-transmission PV solar glass
Solar Cells	72 Polycrystalline cells (156 x 156 mm)

CERTIFICATIONS

UL Listed	ULC990-C1783-1, UL1783, UL1783 Fire Classification Type 1
IEC Listed	IEC 61215, IEC 61730

All Helienne modules are certified under the California Energy Commission (CEC) Listing Report

TEMPERATURE RATINGS

Nominal Operating Cell Temperature (NOCT)	+45°C (122°F)
Temperature Coefficient of P_{max}	-0.43%/°C
Temperature Coefficient of V_{oc}	-0.32%/°C
Temperature Coefficient of I_{sc}	0.05%/°C

PACKAGING CONFIGURATION

Modules per box	26 pieces
Modules per 53' trailer	788 pieces

MAXIMUM RATINGS

Operational Temperature	-40°C ~ +85°C
Max System Voltage	1000V (~1500V) *Optional
Max Series Fuse Rating	15A

WARRANTY

10 Year Manufacturer's Workmanship Warranty
25 Year Linear Power Guarantee
(Refer to product warranty page for details)



CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.
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ST556KWH-D250HV +4xSG125HV

Storage System

SUNGROW | SAMSIUNG | SAMSUNG SDI

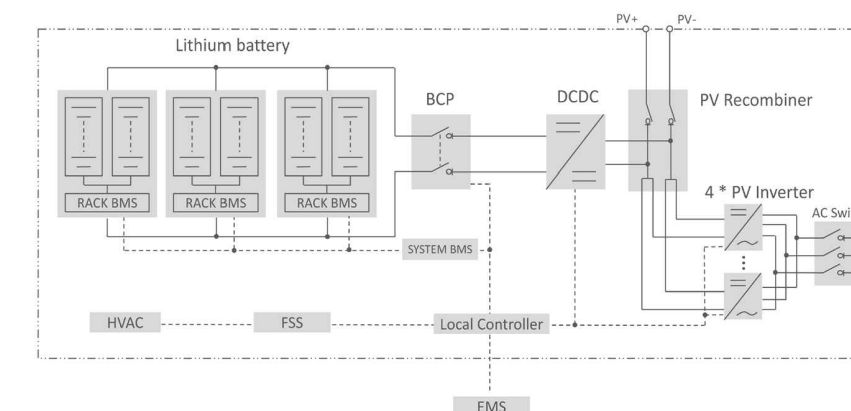
ST556KWH-D250HV+4xSG125HV



SYSTEM FEATURES

- Fully integrated 1500V DC coupled PV+ESS system with "one stop shop"
- Intelligent MPPT-Charging control algorithm enable the high-efficient operation

CIRCUIT DIAGRAM



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System Type	ST556KWH-D250HV+4xSG125HV
PV Data	
Max PV Input voltage	1500 V
MPPT voltage range at nominal power	860 ~ 1250 V
Number of DC inputs	5
Max. PV Input current	1250 A
DCDC Data	
Working voltage range	500 ~ 1500 V
Nominal power	250 kW
Max current	344 A
Battery Data	
Cell type	Samsung SDI Mega E3, 3.68 V / 100 Ah
Configuration of system	2P2S2S3
Battery capacity (BOL)	556 kWh
Battery voltage range	806.4 ~ 1045.8 V
AC Data	
AC output power	500kVA @ 50 °C
Max. AC output current	480 A
Nominal AC voltage	3 / PE, 600 V
AC voltage range	480 ~ 690 V
Nominal grid frequency / Grid frequency range	60 Hz / 55 ~ 65 Hz
Power factor at nominal power / Adjustable power factor	> 0.99 / 0.8 leading ~ 0.8 lagging
Feed-in phases / connection phases	3/5
General Data	
Dimensions (W * H * D)	6,058 * 2,896 * 2,438 mm / 238.5" * 114.0" * 96.0"
Weight (with / without battery)	11.0 T / 7.0 T 24250 lbs / 15432 lbs
Degree of protection	IP 54 / NEMA 3R
Operating temperature range	-30 to 50 °C / -22 to 122 °F
Relative humidity	0 ~ 95 % (non-condensing)
Max. working altitude	2,000 m / 6,562 ft
Cooling concept of battery chamber	Heating, Ventilation and Air Conditioning
Fire suppression system of battery unit	FM-200 extinguishment system
Communication interfaces	RS485, Ethernet
Communication protocols	Modbus RTU, Modbus TCP
Compliance	UL 9540, UL 9540A

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PARK AVENUE
SOLAR SOLUTIONS
102 GREENWICH AVE
GREENWICH, CT 06830
12031698-0090



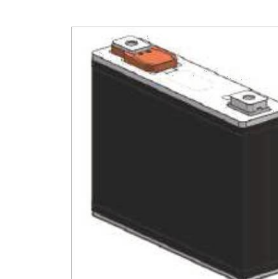
NEW MARLBOROUGH II
EQUIPMENT CUT SHEETS
PV SOLAR GROUND ARRAY
646 MILL RIVER SOUTHFIELD ROAD
NEW MARLBOROUGH, MA 01230

Battery & Racks

SUNGROW | SAMSIUNG | SAMSUNG SDI

SUNGROW | SAMSIUNG | SAMSUNG SDI

Cells



Classification	Specification		
	E3	M3F	
Cell Dimension (Excluding Terminals)	6.8" * 4.9" * 1.8"	6.8" * 4.9" * 1.8"	
Weight	2,150 g	2,150 g	
Capacity (@25 °C)	100 Ah	100 Ah	
Energy Density	Gravimetric	171 Wh/kg	171 Wh/kg
	Volumetric	378.2 Wh/L	378.2 Wh/L
Voltage	Max.	4.15 V	4.15 V
	Nominal	3.68	3.68
	Min.	2.7 V	2.7 V
Temp condition	Operation	-13 °F ~ 140 °F	-13 °F ~ 140 °F
	Storage	-40 °F ~ 140 °F	-40 °F ~ 140 °F

Modules

Classification	Energy E3	Medium M3F	
Image			
Cell type	100 Ah (0.5)	100 Ah (1.0 C)	
Configuration	2P2S	2S2P	
Energy [kWh]	8.83	8.096	
Power[kW]	Continuous (CHC)	4.42 (0.5C)	8.09 (1C)
	Continuous (DCHC)	4.42 (0.5C)	8.09 (1C)
	Operating Voltage[V]	38.4 ~ 49.8	70.4 ~ 91.3
	Dimension (W * L * H)	14.6*25.1*6.3	14.6*25.6*6.3
E-Density	Wh /kg	152.3	144.5
	Wh /L	234.2	210.4

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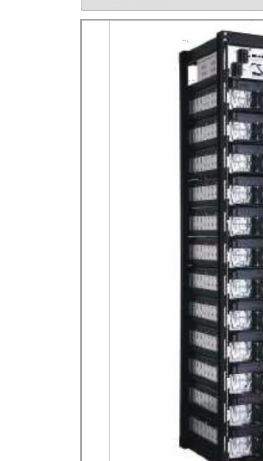
Racks

E3



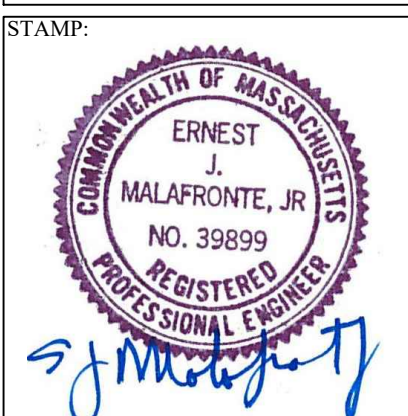
Item	Power	Power	Power	
Config. (1rof module)	-	2P2S2S	2P28S5	2P324S
Cell Capacity	Ah	100	100	100
Energy	kWh	185.5	212	238.5
Charging Power	kW	92.7	106	119.2
Discharging Power	kW	92.7	106	119.2
Nominal Voltage	V	927.4	1059.8	1192.3
Operating Voltage	V	806.4-1045.8	921.6-1195.2	1036.8-1344.6
Dimension (W*H*D)	in	34.5*77.1*28	34.5*90.2*28	34.5*90.2*28

M3F



Item	Medium	Medium	Medium	
Config. (1rof module)	-	198S1P	242S1P	264S1P
Cell Capacity	Ah	100	100	100
Energy	kWh	72.9	89.1	97.2
Max Charging Power	kW	72.9	89.1	97.2
Max Discharging Power	kW	87.4	106.9	116.6
Nominal Voltage	V	728.6	890.6	971.5
Operating Voltage	V	633.6-821.7	774.4-1004.3	844.8-1095.6
Dimension (W*H*D)	in	17.4*70.6*27.6	17.2*83.6*27.6	17.4*90.2*27.6

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